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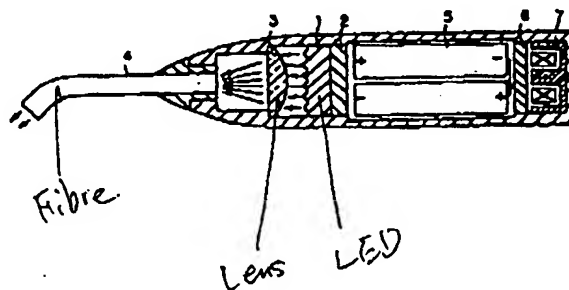
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(54) 【発明の名称】 光照射器

(57) 【要約】

【目的】 光源として、レジンの硬化に有効な約480nmの波長の光を発生する発光ダイオードを複数個光重合用光源として用いる。

【構成】 発光ダイオードプレート1は複数個の発光ダイオードを有し、各発光ダイオードからの光をレンズ3により集光して光ガイド4に導入する。光ガイド4に導入された光は、その先端から放出されてレジンを硬化する。



(3)

3

ために、複数個の発光ダイオードが、気密性、光の指向性を得るために、マイクロレンズ状をした気密性のパッケージに一体的に形成され、これらマイクロレンズ状のパッケージが平板基板上に実装されて形成されている。なお、図示しないが、光量の調整機能、光量を安定化するフィードバック機能、照射時間タイマー等は必要により付加可能であり、また、図には、コイル結合による充電機能を有する例を示したが、充電機能を別体にするようにすることも可能であり、更には、乾電池を使用するようにすることも可能であることは容易に理解できよう。

【0011】

【発明の効果】以上の説明から明らかなように、本発明によると、ランプ式の照射器に比して、寿命の長く、しかも、ランプ方式で必要としたフィルターやミラー等を

必要としない、更には、熱対策を必要としない、非常に使い勝手のよい、手持型の光重合用光照射器を提供することができる。

【図面の簡単な説明】

【図1】 本発明による光重合用光照射器の一実施例を説明するための断面図である。

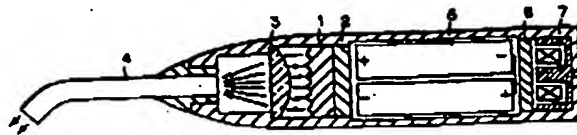
【図2】 光重合用光照射器の一使用例を説明するための図である。

【図3】 従来のランプ式の光重合用光照射器の一例を説明するための図である。

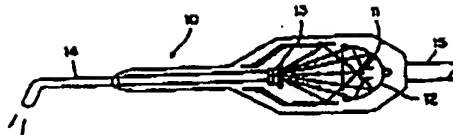
【符号の説明】

1…発光ダイオードプレート、2…発光ダイオード駆動回路、3…集光レンズ、4…光ガイド、5…バッテリー、6…光電圧制御回路、7…充電用コイル。

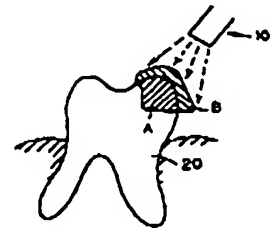
【図1】



【図3】



【図2】



**PAGE 3**

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(11) Unexamined Patent Application: Heisei 8-141001  
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(22) Application Filed: November 18, 1994

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(54) [Title of the Invention] LIGHT ILLUMINATION DEVICE

(57) [Abstract]

[Object] A plurality of light-emitting diodes generating light with a wavelength of about 480 nm, which is effective for curing resins, are used as light sources for photopolymerization.

[Structure] A light-emitting diode plate 1 contains a plurality of light-emitting diodes, and light emitted from the light-emitting diodes is condensed by a lens 3 and introduced into a light guide 4. The light introduced into the light guide 4 is emitted from its end to cure a resin, etc.



## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : OSADA RES INST LTD

(22)Date of filing : 18.11.1994

(72)Inventor : GOTO SHIGERU  
SADOHARA TOSHIYUKI

(54) OPTICAL IRRADIATOR

(57)Abstract:

PURPOSE: To use plural light emitting diodes which emit light of specific wavelength as a light source for photopolymerization.

CONSTITUTION: A light emitting diode plate 1 is provided with plural diodes, and converges light of wavelength of around 480nm effective for the curing of resin from each light emitting diode by a lens 3, and introduces it to a light guide 4. The light introduced to the light guide 4 is emitted from the tip of the guide, and cures the resin, etc.



## LEGAL STATUS

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CLAIMS

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[Claim(s)]

[Claim 1] The optical irradiation machine characterized by having the optical system which condenses the light from two or more light emitting diode and each light emitting diode, and the light guide into which the light condensed by this optical system is introduced, introducing into the aforementioned light guide the light which emitted light by the aforementioned light emitting diode, and emanating from the exudation edge of this light guide.

[Claim 2] The optical irradiation machine according to claim 1 characterized by being what generates the light of the wavelength whose aforementioned light emitting diode is about 480nm.

[Claim 3] The optical irradiation machine according to claim 1 or 2 characterized by being unified with the airtight package whose aforementioned light emitting diode carried out the micro-lens configuration.

[Claim 4] The optical irradiation machine according to claim 1, 2, or 3 characterized by building in a power cell and making the aforementioned light emitting diode emit light by this power cell.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention relates to the optical irradiation machine for photopolymerization for stiffening an optical irradiation machine and the photoresist resin used [ in / an odontotherapy / more / in a detail ] as restorative dental materials after the odontogenesis.

[0002]

[Description of the Prior Art] Although photopolymerization resin is used as restorative dental materials after the odontogenesis in an odontotherapy, after pasting the breakage of a tooth, light is irradiated, and is stiffened, cutting, polishing, etc. are performed after hardening, and it is made to unite with the original tooth, and when using it as restorative dental materials of a tooth, this photopolymerization resin gives aesthetics and restores the tooth before a crash.

[0003] Among drawing, drawing 2 is drawing for a \*\*\*\* solving and explaining a method for a repair of a tooth, 20 are the tooth (the original tooth) which has breakage A, and in order to restore this breakage, they paste up photopolymerization resin on this breakage. At this time, more resin is pasted up so that breakage A may be included (to the field of B). Thus, after pasting up resin on the crash section of the damaged tooth, light is irradiated with the optical irradiation vessel 10, and resin is stiffened, and after that, cutting, polishing, etc. are performed, B section is removed, and it leaves only the resin of A section, and restores to the tooth of the origin which contains A section by this.

[0004] Drawing 3 is an outline block diagram for explaining an example of the conventional optical irradiation machine, and as for the inside of drawing, and 11, an ellipse mirror and 13 are the cables with which a VCF and 14 connote light guides (an optical tube, optical-fiber flux, fiber rod, etc.), and, as for 15, the light source and 12 connote lead wire, and as everyone knows, the light source 11 is in the focal position of the ellipse reflective mirror 12, and reflects the light from this light source 11 by the ellipse reflective mirror. This reflected light is introduced in the light guide 14 in which the light-receiving edge was arranged near the focal position of another side which makes the focus of the aforementioned ellipse reflective mirror, and a pair, is transmitted through this light guide 14, and is irradiated by photopolymerization resin as mentioned above. In addition, VCF 13 makes only the light of a light wave length component required for photopolymerization among the light from the light source 11 penetrate, and passes only the wavelength component near 480nm.

[0005]

[Problem(s) to be Solved by the Invention] As mentioned above, although the conventional optical irradiation machine for photopolymerization was using the lamp for the light source, it was the problem that a lamp had problems, like the life of a lamp in which only a few contains the wavelength component required for photopolymerization and which has thrown away an excessive light in the type of heat is short, and had to miss the heat further generated by the light of the wavelength which is not used for photopolymerization by meanses, such as cooling.

[0006] A \*\*\*\* solves this invention and it was made in view of the actual condition, by using effectively the light emitting diode which generates light with a wavelength of about 480nm especially, the \*\*\*\*



which a conventional lamp-type photopolymerization machine has solves it, abolishes a trouble, and is made for the purpose of offering the more user-friendly optical irradiation machine for photopolymerization.

[0007]

[Means for Solving the Problem] In order that this invention may solve the above-mentioned technical problem, the light emitting diode of (1) plurality, It has the optical system which condenses the light from each light emitting diode, and the light guide into which the light condensed by this optical system is introduced. It is characterized by introducing into the aforementioned light guide the light which emitted light by the aforementioned light emitting diode, and emanating from the exudation edge of this light guide. further (2) -- it is what generates the light of the wavelength whose aforementioned light emitting diode is about 480nm -- further (3) Further, (4) power cell is built in and the aforementioned light emitting diode is characterized by to be unified with the airtight package which carried out the micro-lens configuration, and making the aforementioned light emitting diode emit light by this power cell.

[0008]

[Function] As light source, the light of the light emitting diode of these plurality is effectively introduced into a light guide, using the light emitting diode which generates light with a wavelength of about 480nm two or more, and the light emitted from this light guide is used as light sources for photopolymerization, such as resin.

[0009]

[Example] Drawing 1 is a cross section for explaining one example of the optical irradiation machine for photopolymerization by this invention. For a condenser lens and 4, as for a dc-battery and 6, a light guide and 5 are [ a light emitting diode (Light Emitting Diode) plate and 2 / a light emitting diode drive circuit and 3 / a charge control circuit and 7 ] charging current armatures. the inside of drawing, and 1 -- The light which many light emitting diodes whose photogenesis frequencies are about 480nm are arranged by the light emitting diode plate 1, and was generated from each light emitting diode It converges on a condenser lens 2, is introduced into a light guide 4, it emanates from the nose of cam of this light guide 4, and the resin for a tooth repair is hardened as mentioned above.

[0010] As mentioned above, in order to obtain the predetermined quantity of light, in order that two or more light emitting diodes may obtain airtightness and the directivity of light, the light source is formed in the airtight package which carried out the shape of a micro lens in one, and a these micro-lenses-like package is mounted on a monotonous substrate, and it is formed. In addition, although the example which can add the adjustment function of the quantity of light, the feedback function which stabilizes the quantity of light, an irradiation time timer, etc. as occasion demands, and has a charge function by coil combination in drawing although not illustrated was shown, it can be understood easily that it is possible in it being made to use a charge function as another field, and it is also still possible to use a dry element battery.

[0011]

[Effect of the Invention] According to this invention, as compared with a lamp-type irradiation machine, a life is long and the very user-friendly optical stock type irradiation machine for photopolymerization which needs neither the VCF moreover needed by the lamp method nor a mirror and which does not need the cure against heat further can be offered so that clearly from the above explanation.

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is a cross section for explaining one example of the optical irradiation machine for photopolymerization by this invention.

[Drawing 2] It is drawing for explaining the example of 1 use of the optical irradiation machine for photopolymerization.

[Drawing 3] It is drawing for explaining an example of a conventional lamp-type photopolymerization light irradiation machine.

[Description of Notations]

1 [ -- A condenser lens, 4 / -- A light guide, 5 / -- A dc-battery, 6 / -- The control circuit for photoelectricity, 7 / -- Coil for charge. ] -- A light emitting diode plate, 2 -- A light emitting diode drive circuit, 3

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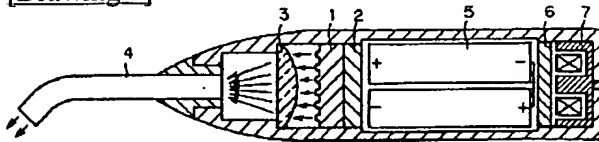
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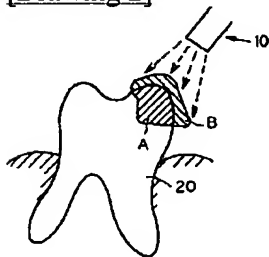
DRAWINGS

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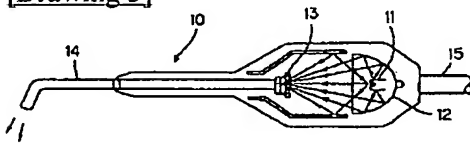
[Drawing 1]



[Drawing 2]



[Drawing 3]



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[Translation done.]

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(22) 出願日 平成 6 年 (1994) 11 月 18 日

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式会社長田中央研究所内

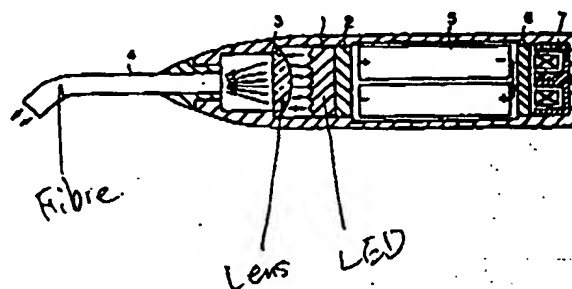
(74) 代理人 弁理士 高野 明近

(54) 【発明の名称】 光照射器

(57) 【要約】

【目的】 光源として、レジンの硬化に有効な約 480 nm の波長の光を発生する発光ダイオードを複数個光重合光源として用いる。

【構成】 発光ダイオードプレート 1 は複数個の発光ダイオードを有し、各発光ダイオードからの光をレンズ 3 により集光して光ガイド 4 に導入する。光ガイド 4 に導入された光は、その先端から放出されてレジンを硬化する。



②

(3)

ために、複数の発光ダイオードが、気密性、光の指向性を得るために、マイクロレンズ状をした気密性のパッケージに一体的に形成され、これらマイクロレンズ状のパッケージが平板基板上に実装されて形成されている。なお、図示しないが、光量の調整機能、光量を安定化するフィードバック機能、照射時間タイマー等は必要により付加可能であり、また、図には、コイル結合による充電機能を有する例を示したが、充電機能を別体にするようにすることも可能であり、更には、乾電池を使用するようにすることも可能であることは容易に理解できよう。

【0011】

【発明の効果】以上の説明から明らかなように、本発明によると、ランプ式の照射器に比して、寿命の長く、しかも、ランプ方式で必要としたフィルターやミラー等を

必要としない、更には、熱対策を必要としない、非常に使い勝手のよい、手持型の光重合用光照射器を提供することができる。

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【図1】 本発明による光重合用光照射器の一実施例を説明するための断面図である。

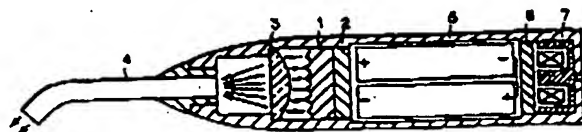
【図2】 光重合用光照射器の一使用例を説明するための図である。

【図3】 従来のランプ式の光重合光照射器の一例を説明するための図である。

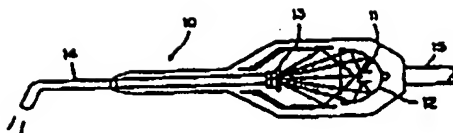
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【図1】



【図3】



【図2】



③

**PAGE 3**

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Examination Request: None      No. of Claims: 4 OL (total pages 3)

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(22) Application Filed: November 18, 1994

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(54) [Title of the Invention] **LIGHT ILLUMINATION DEVICE**

(57) [Abstract]

[Object] A plurality of light-emitting diodes generating light with a wavelength of about 480 nm, which is effective for curing resins, are used as light sources for photopolymerization.

[Structure] A light-emitting diode plate 1 contains a plurality of light-emitting diodes, and light emitted from the light-emitting diodes is condensed by a lens 3 and introduced into a light guide 4. The light introduced into the light guide 4 is emitted from its end to cure a resin, etc.

**PAGE 4**

[Note: Incomplete paragraph was not translated since it started in the middle of a sentence.]

[0011]

**[Effect of the Invention]**

The description presented above clearly shows that the light illumination device in accordance with the present invention has a service life longer than that of the lamp-type illumination devices and requires no filters and mirrors that were necessary in the lamp-type system. Furthermore, a hand-held light illumination device for photopolymerization is provided that can be handled very easily and requires no measures against heat.

**[Brief Description of the Drawings]**

Fig 1 is a cross section illustrating an embodiment of the light illumination device for photopolymerization in accordance with the present invention.

Fig 2 illustrates the utilization of the light illumination device for photopolymerization.

Fig 3 illustrates an example of the conventional lamp-type light illumination device for photopolymerization.

**[Legends]**

1 - light-emitting diode plate; 2 - driving circuit for light-emitting diodes; 3 - condensing lens; 4 - light guide; 5 - battery; 6 - control circuit (illegible); 7 - coil for charging.